Log Event A

Borehole 50-06-17

Borehole Information

Farm : T	**Tank :** T-106	**Site Number :** 299-W10-162
N-Coord : 43,504	**W-Coord :** 75,820	**TOC Elevation :** 670.90
Water Level, ft :	**Date Drilled :** 7/31/1975	

Casing Record

Type : Steel-welded	Thickness, in. : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 91	
Type : Steel-welded	Thickness, in. : 0.365	ID, in. : 10
Top Depth, ft. : 0	Bottom Depth, ft. : 90	

Cement Bottom, ft. : 90 **Cement Top, ft. :** 0

Borehole Notes:

Borehole 50-06-17 was drilled in July 1975 to a total depth of 122 ft. Data from the drilling log and Chamness and Merz (1993) were used to provide borehole construction information. The borehole was telescoped to total depth using 10-in. and 6-in. casings. The 10-in. casing was installed to a depth of 90 ft; the 6-in. casing was then advanced to 122 ft. In October 1975, the 6-in. casing was retracted to a depth of 91 ft and the resultant open borehole below the bottom of the 6-in. casing was backfilled with grout. No information concerning perforations was provided in the drilling log or Chamness and Merz (1993). However, the drilling log states that this borehole was "cemented," implying that the annular space between the 6-in. and 10-in. casings was filled with grout. The thicknesses of the 6-in. and 10-in. casings are presumed to be 0.280 in. and 0.365 in., respectively, on the basis of the published thickness for schedule-40, 6-in. and 10-in. steel tubing.

Equipment Information

Logging System : 2B	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 11/1997	**Calibration Reference :** GJO-HAN-20	**Logging Procedure :** MAC-VZCP 1.7.10-1

Logging Information

Log Run Number :	1	**Log Run Date :**	02/19/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	200	**L/R :** L **Shield :**	N
Finish Depth, ft. :	7.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	02/20/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	6.0	**Counting Time, sec.:**	200	**L/R :** L **Shield :**	N
Finish Depth, ft. :	33.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Borehole 50-06-17

Log Event A

Log Run Number :	3	**Log Run Date :**	02/20/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	32.0	**Counting Time, sec.:**	200	**L/R :** R	**Shield :** N
Finish Depth, ft. :	57.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	4	**Log Run Date :**	02/23/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	86.5	**Counting Time, sec.:**	200	**L/R :** R	**Shield :** N
Finish Depth, ft. :	55.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Logging Operation Notes:

This borehole was logged by the SGLS in four log runs using a 200-s counting time. The top of the borehole casing, which is the zero reference for the SGLS, is approximately flush with the ground surface. The total logging depth achieved was 86.5 ft.

Increasing dead time was encountered during log run two at a depth of 33 ft. As a result, log runs three and four were logged in real time from 32 to 86.5 ft.

Analysis Information

Analyst : E. Larsen

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 07/06/1998

Analysis Notes :

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

This borehole is double-cased with 6-in.- and 10-in.-diameter casings along the entire length of the logged interval. A casing correction factor for a 0.650-in.-thick steel casing was applied to the concentration data because it most closely matched the 0.645-in. total combined thickness of the double casing. The entire annulus between the 6-in. and 10-in. casings is most likely filled with grout, making calculation of accurate radionuclide concentrations impossible. However, man-made and natural radionuclides were identified and apparent concentrations are reported.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the estimated uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the

Borehole 50-06-17

Log Event A

spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A time-sequence plot of the historical gross gamma log data from 1975 to 1994 is presented with the SGLS log plots. Plots that compare the decay rate of the historical gross gamma data with the calculated decay curves for specific radionuclides are also included.

Results/Interpretations:

The radionuclide concentrations identified in this section are reported as only apparent concentrations and are underestimated.

Detector saturation occurred from 34.5 ft to the bottom of the logged interval (86.5 ft). As a result, no usable spectral data were collected along this region of the borehole.

The man-made radionuclides Cs-137 and Eu-154 were detected by the SGLS. The Cs-137 contamination was measured nearly continuously from the ground surface to 27 ft and from 28.5 to 34 ft. Isolated occurrences of Eu-154 were detected at 7 and 10 ft and from 33 to 33.5 ft.

The K-40 and Th-232 concentration values are absent from about 34 ft to the bottom of the logged interval. The U-238 concentrations are absent from about 32 ft to the bottom of the logged interval.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank T-106.